IN THE CLAIMS

1. (Original) A method for reconstruction of the attenuation density of an object from X-ray projection image data values, comprising the steps of:

- representing the attenuation density of said object by a sum of predetermined continuous harmonics with unknown coefficients;

- relating each of said X-ray projection image data values to an integral of the attenuation density of said object, and thus to a corresponding sum of sums of said predetermined continuous harmonics with unknown coefficients;

- determining said unknown coefficients from the relations between each of said X-ray projection image data values and the respective corresponding sum of sums of said predetermined continuous harmonics with unknown coefficients; and

- reconstructing the attenuation density of said object by said sum of predetermined continuous harmonics with said determined coefficients.

2. (Original) The method of claim 1 wherein different ones of said predetermined continuous harmonics represent different spatial frequencies of the attenuation density of said object.

3. (Original) The method of claim 1 wherein said predetermined continuous harmonics are any of Newton polynomials, spline interpolating functions, Fourier harmonics, Bessel functions, and Green functions.

4. (Original) The method of claim 3 wherein said predetermined continuous harmonics are selected to be of the kind, which minimizes the coupling of equations for given symmetries of object positions.

5. (Original) The method of claim 1 wherein said predetermined continuous harmonics is of a number, which is less than the number of said X-ray projection image data values.

6. (Original) The method of claim 1 wherein said predetermined continuous harmonics is of a number, which maximizes the signal-to-noise ratio of the reconstructed attenuation density of said object.

7. (Original) The method of claim 1 wherein said X-ray projection image data values are obtained from X-ray absorption or transmission measurements, and said integrals of the attenuation density of said object are each an integral along a straight line along which X-rays traveled to produce the related X-ray projection, image data value.

8. (Original) The method of claim 7 wherein said X-ray projection image data values are tomosynthesis data values, and said reconstruction is a tomosynthesis reconstruction.

9. (Original) The method of claim 7 wherein said X-ray projection image data values are tomographic, PET, or SPECT data values, and said reconstruction is a tomographic, PET, or SPECT reconstruction.

10. (Original) The method of claim 1 wherein each said sum of sums of said predetermined continuous harmonics is computed, numerically or analytically, prior to obtaining said X-ray projection image data values.

11. (Original) The method of claim 1 wherein said sum of predetermined continuous harmonics with unknown coefficients are selected depending on their estimated signal-to-noise ratio.

12. (Original) The method of claim 1 wherein said sum of predetermined continuous harmonics with unknown coefficients are selected depending on the quality of the matrices arising in the equations determining coefficients.

13. (Original) A method for reconstruction of the attenuation density of an object from X-ray projection image data values, comprising the steps of:

- approximating the attenuation density S(x,y,z) of said object by predetermined continuous harmonics H_{ijk} (x,y,z) with unknown coefficients a_{ijk} according to $S(x,y,z) = \Sigma\ a_{ijk} * H_{ijk}\ (x,y,z)$, where the number of said harmonics is lower than the number of said X-ray projection image data values;

- relating each of said X-ray projection image data values $V(p_q)$ to the attenuation density of said object according to $-\ln(V(p_q) = S(P_q)$, q = 1, 2, 3, ..., where $S(P_q)$ is a sum of attenuation density values of said object;

- relating each of said X-ray projection image data values V (P_q) tosaid harmonics according to $-\ln (V(P_q)) = \Sigma\ a_{ijk}\ {}^{*}H_{ijk}\ (P_q)$ to form a linear equation system, where H_{ijk} (P_q) is a sum of harmonics corresponding to said sum of attenuation density values of said object;

- calculating the unknown coefficients a_{ijk} by solving said linear equation system; and

- reconstructing the attenuation density of said object by calculating S (x, y, z) = $\Sigma\ a_{ijk}\ {}^{*}$Hi;k (x, Y, z) .

14. (Original) The method of claim 13 wherein said X-ray projection image data values are obtained from X-ray transmission measurements, and said

sums of attenuation density values $S(P_q)$, p = 1, 2, 3, ..., are each a sum along a respective straight X-ray path from an X-ray source to a pixel of a detector, in which pixel the corresponding X-ray projection image data value was detected.

15. (Currently Amended) A computer program product loadable into the internal memory of a computer, comprising software code portions for performing the method of claim 1 ~~or 13~~ when said product is run on said computer.

16. (Original) An apparatus for reconstruction of the attenuation density of an object from X-ray projection image data values, said apparatus comprising:

- means provided to represent the attenuation density of said object by a sum of predetermined continuous harmonics with unknown coefficients;

- means provided to relate each of said X-ray projection image data values to an integral of the attenuation density of said object, and thus to a corresponding sum of sums of said predetermined continuous harmonics with unknown coefficients;

- means provided to determine said unknown coefficients from the relations between each of said X-ray projection image data values and the respective corresponding sum of sums of said predetermined continuous harmonics with unknown coefficients; and

- means provided to reconstruct the attenuation density of said object by said sum of predetermined continuous harmonics with said determined coefficients.

17. (Original) An X-ray examination system comprising:

- the apparatus for reconstruction as claimed in claim 16;

- an X-ray detector provided to produce the X-ray projection image data values; and

- a display unit for displaying object attenuation density values, wherein

- said apparatus for reconstruction is provided (i) to receive the X-ray projection image data values from said X-ray detector, and (ii) to supply data regarding the attenuation density of said object to said display unit.

18. (New) A computer program product loadable into the internal memory of a computer, comprising software code portions for performing the method of claim 13 when said product is run on said computer.